

Remarks

In the outstanding Official Action, the Examiner:

(1) rejected claims 1 and 2 under 35 USC 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention; and

(2) rejected claims 1 and 12 under 35 USC 103(a) as being unpatentable over Wakabayashi et al.

In response to Item 1 above, Applicants have now amended independent claims 1 and 2 so as to more clearly define the present invention. Specifically, Applicants have now amended independent claims 1 and 2 to insert -- a device comprising -- prior to "a tunable Fabry-Perot filter or a tunable VCSEL" at lines 2 and 1 thereof, respectively. Accordingly, Applicants believe that independent claims 1 and 2 are in condition for allowance, and allowance thereof is respectfully requested.

In response to Item 2 above, Applicants have now amended independent claims 1 and 2 so as to more clearly define the present invention with respect to the prior art of record.

Specifically, Applicants have now amended independent claims 1

and 2 to modify the whereby statements so as to more clearly define the structure of the present invention.

Independent claim 1 of the present invention comprises a wavelength reference apparatus for use in calibrating a device comprising a tunable Fabry-Perot filter or tunable VCSEL, the wavelength reference apparatus being configured to tune the device to a precise, known wavelength, the wavelength reference apparatus comprising an LED having an emission profile which varies with wavelength; and the device being swept through its tuning range by varying the tuning voltage applied to the device, the known transmission wavelengths established by the LED and the etalon are correlated to counterpart tuning voltages of the device so as to calibrate the device.

Independent claim 2 of the present invention comprises a method for calibrating a device comprising a tunable Fabry-Perot filter or a tunable VCSEL, the wavelength reference apparatus being configured to tune the device to a precise, known wavelength, the method comprising the steps of energizing an LED so as to produce an emission of light, the LED having an emission profile which varies with wavelength; passing the light output by the LED through an etalon so as to generate a comb of known transmission peaks, with each transmission peak occurring at a

precise, known wavelength; passing light from the etalon to the device, and sweeping the device through its tuning range by varying the tuning voltage applied to the device so as to correlate the known wavelength of each transmission peak and the tuning voltage associated with that wavelength so as to calibrate the device.

Applicants believe that Wakabayashi et al. disclose a laser wavelength controlling apparatus including a wavelength selective element for narrowing the bandwidth of an oscillating laser beam; a wavelength selection controller and a wavelength selective element driver for changing the wavelength to be selected by the wavelength selective element; a reference light source for generating a reference light for measuring the wavelength of the oscillating laser beam; a wavelength detector for leading the oscillating laser beam and the reference light into a spectroscope and detecting the absolute wavelength of the oscillating laser beam on the basis of the detected value of the reference light; and a wavelength detecting driver for controlling the wavelength to be selected by the wavelength selective element in cooperation with the wavelength controller so as to correspond the absolute wavelength detected by the wavelength detector with the preset wavelength. Applicants

believe that Wakabayashi et al. teach computing the difference between a present wavelength of the reference light and the wavelength of the oscillating laser beam so as to stabilize the wavelength of the oscillating laser beam.

Applicants believe that Wakabayashi et al. do not disclose a wavelength reference apparatus for use in calibrating a device comprising a tunable Fabry-Perot filter or a tunable VCSEL, the wavelength reference device comprising an LED having an emission profile which varies with wavelength; and the device being swept through its tuning range by varying the tuning voltage applied to the device, the known transmission wavelengths established by the LED and the etalon are correlated to counterpart tuning voltages of the device so as to calibrate the device.

Applicants believe that Wakabayashi et al. do not disclose a method for calibrating a device comprising a tunable Fabry-Perot filter or a tunable VCSEL, the method comprising the steps of energizing an LED so as to produce an emission of light, the LED having an emission profile which varies with wavelength; and sweeping the device through its tuning range by varying the tuning voltage applied to the device so as to correlate the known wavelength of each transmission peak and the tuning voltage associated with that wavelength so as to calibrate the device.

Applicants believe that Wakabayashi et al. teach away from the present invention in that the reference light source appears to have a narrow bandwidth for stabilizing the oscillated laser beam to an accuracy substantially equivalent thereto. In addition, Applicants believe that Wakabayashi et al. do not teach sweeping a tunable Fabry-Perot filter or a tunable VCSEL through its tuning range so as to correlate the known wavelength of each transmission peak and the tuning voltage associated with that wavelength so as to calibrate the device. Accordingly, independent claims 1 and 2 are believed to be in condition for allowance, and allowance thereof is respectfully requested.

Claims 3-6, which depend directly from independent claim 1, are believed to be in condition for allowance at least for the above-identified reasons. Accordingly, allowance of claims 3-6 is respectfully requested.

Claim 7-12, which depend directly from independent claim 2, are believed to be in condition for allowance at least for the above-identified reasons. Accordingly, allowance of claims 7-12 is respectfully requested.

On account of the foregoing, claims 1-12 are believed to be in condition for allowance. Early and favorable reconsideration is therefore respectfully requested.

In the event that any additional fees may be required in this matter, please charge the same to Deposit Account No. 16-0221.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) A wavelength reference apparatus for use in calibrating a device comprising a tunable Fabry-Perot filter or a tunable VCSEL, [whereby] the wavelength reference apparatus being configured to tune the device [may be tuned] to a precise, known wavelength, the wavelength reference apparatus comprising:

an LED, [where] the LED [is chosen so as to have] having an emission profile which varies with wavelength;

an etalon, where the etalon is chosen so as to have a transmission profile which comprises a comb of transmission peaks, with each transmission peak occurring at a precise, known wavelength; [and]

a detector for detecting the light emitted by said LED and passing through said etalon; and

[whereby when a tunable Fabry-Perot filter or tunable VCSEL is] the device being positioned between said etalon and said detector, and the device [is] being swept through its tuning range by varying the tuning voltage applied to the device, the known transmission wavelengths established by said LED and said etalon [can be] are correlated to counterpart tuning voltages of the device[, whereby] so as to calibrate the device.

2. A method for calibrating a device comprising a tunable Fabry-Perot filter or a tunable VCSEL, [whereby] the wavelength reference apparatus being configured to tune the device [may be tuned] to a precise, known wavelength, the method comprising the steps of:

(1) energizing an LED so as to produce an emission of light, the LED [being chosen so as to have] having an emission profile which varies with wavelength;

(2) passing the light output by the LED through an etalon so as to generate a comb of known transmission peaks, with each transmission peak occurring at a precise, known wavelength;

(3) passing light from the etalon to the device; and

(4) sweeping the device through its tuning range by varying the tuning voltage applied to the device[, whereby a correlation may be established between] so as to correlate the known wavelength of each transmission peak and the tuning voltage associated with that wavelength[, whereby] so as to calibrate the device.

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